Forest Pest Management

Pacific Southwest Region

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Subject: Bark beetle activity in Delleker (Report #NE98-7)

To: Suzanne Ebright, Agricultural & Weights & Measures Inspector
Plumas and Sierra Counties

At your request I visited two private residences in Delleker, Plumas Co. Home owners had expressed concern about bark beetle attacks on the Jeffrey pine trees on their properties. The objective of the field visit was to examine some the trees to confirm bark beetle activity, identify the bark beetles involved and to discuss what effects the attacks may have on tree survival. The field visit was conducted on August 28, 1998. The property locations were 290 and 300 Bella Vista Drive.

290 Bella Vista

This property has several Jeffrey pine trees that are located around an irrigated yard and other Jeffrey pines that are beyond the fence near the National Forest boundary. We observed several trees that had red turpentine beetle (RTB) attacks. There were current attacks from this year as well as older pitch tubes and frass from previous years. There were not any dead trees on this property but there was one 8 inch DBH tree next to the fence on the adjacent property that was dead. This tree had older RTB attacks and appeared to have faded this spring.

300 Bella Vista

This property has several Jeffrey pine trees ranging in size from about 4 to 20 inches DBH. The property owner is in the process of thinning the trees to reduce fire hazard. The boles are being used for personal firewood and are stacked on the site. The slash is being piled and burned as conditions allow.

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Currently burning is restricted. Several of the stumps and residual trees have current RTB attacks. Older attacks were also present on several trees. The number of attacks (pitch tubes) on the individual trees we examined ranged from 2 to 10. Both successful and unsuccessful attacks were present. In addition, I also observed Ips pini adults and larvae in the unburned slash piles and in the stacked boles.

Discussion

Characteristic of red turpentine beetle, most attacks were within the first few feet around the base of the tree. I did not observe any logging wounds on the residual trees however several of the attacked trees were in close proximity to cut stumps. The majority of the cut stumps had red turpentine beetle attacks as well, and, in general, beetle development was similar to that in the standing trees. Based on my observations it appears that red turpentine beetle activity has been occurring in this area for a couple of years and has become more prevalent since the thinning operation which began in June, 1998. Several of the lots around Delleker contain more trees than the sites can support. The red turpentine beetle activity in this area over the past few years is indicative of the overstocked condition. It is likely that the cut stumps provided additional host material for the beetles when they emerged this year.

The red turpentine beetle normally attacks injured, weakened or dying trees and freshly cut stumps. The adults are attracted to fresh pine resin. A beetle-produced aggregation pheromone is also important in attracting additional beetles into suitable hosts. Attacks usually occur at the soil line or root crown and are characterized by a large reddish pitch tube at the point of entry. If an attack is successful, the adults excavate an irregular gallery in the cambium and the female lays eggs along the sides. Attacks usually do not kill trees but may predispose them to attack by other bark beetles. Repeated or extensive attacks by the red turpentine beetle can kill pine trees.

Little can be done to control red turpentine beetles once they are beneath the bark. Good health and vigor in a tree are the best protection against infestation. The feeding activity of the adult beetles and their larval offspring kills a limited amount of living tissue. If enough beetles attack a tree so that feeding areas overlap the tree will die as a consequence of the girdling. Some additional bark beetle activity may occur in the heavily attacked trees, however; Jeffrey pine beetle-related mortality was not observed in the genereal area around Delleker. Several factors may have come to play in this incidence including: timing of thinning; timing of beetle development and emergence; ongoing RTB activity; presence of freshly cut stumps and tree health. Additional information about red turpentine beetles can be found attached to this document.

Precipitation over the past three years has been at or above normal in this area. Based on the ongoing basal area reduction, the current amount of RTB attacks and the adequate precipitation regime I would expect minimal, if any, tree mortality at this time.

The slash piles and stacked logs are infested with Ips pini. It is unlikely that these beetles will pose any problems to the residual trees, however, I would encourage the home owner not to put the slash pile or stacked logs up next to any residual trees. I have included some general guidelines regarding Ips for you information. I would also recommend that burn piles not be located close to residual trees as fire damaged trees are more susceptible to bark beetle attacks.

As we discussed in the field, there are pesticides that are registered for bark beetle prevention. The use of one of these chemicals on the lower boles will likely prevent further red turpentine beetle attacks on the residual trees. I have included copies of the chemical labels for your use.

General Tree Maintenance

The key goals for those responsible for vegetation management in a landscape setting include the health, safety, function and attractiveness of the trees. Tree health is extremely important for a tree to be able to grow and develop to its potential and to be able to withstand and recover from unfavorable environments, noninfectious disorders, diseases, insects and other pests and unwise cultural practices. Strong structure is essential for large trees to function and be safe. An integrated approach for maintaining healthy trees includes; managing nutrient, water and aeration levels; pruning; monitoring tree performance; preventing or moderating tree problems and knowing when a tree should be replaced. Such an approach will improve landscape performance and function, increase the efficiency and effectiveness of maintenance and preserve more existing trees.

Please find an enclosure with this report. "A Technical Guide to Urban and Community Forestry" was produced to help communities develop, manage and protect their forest resources. It contains technical information about growing trees in the relatively adverse urban environment. I hope you find information in this helpful.

If you have any questions regarding this evaluation or request additional assistance please contact me at 916-252-6667. Thank you.

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Enclosures

Red Turpentine Beetle

The red turpentine beetle, Dendroctonus valens, occurs throughout California and can breed in all species of pines. It normally attacks injured, weakened or dying trees and freshly cut stumps. The adults are attracted by fresh pine resin. They often attack wounded trees in campgrounds or following logging, trees scorched by wildfire or prescribed burns, lightning-struck trees and root-diseased trees exhibiting resinosis.

Attacks usually occur at the soil line or root crown and are characterized by a large reddish pitch tube at the point of entry. On severely stressed trees or during periods of drought, attacks may occur underground on the main roots up to 15 feet from the bole and also on the bole to a height of 10 feet. If an attack is successful, the adults excavate an irregular gallery in the cambium and the female lays eggs along the sides. The larvae feed in a mass and destroy an area of cambium ranging from 0.1 to 1.0 square feet. Attacks do not always kill trees but may predispose them to attack by other bark beetles. Repeated or extensive attacks by the red turpentine beetle can kill pines.

Attacks occur throughout warm weather and peak at mid-summer. The number of generations varies from two years for a single generation at the coldest portions of its range to two or three per year in the warmest.

Attacks can be minimized or prevented by avoiding soil compaction and injury to standing trees during logging or construction and also by insecticide application to high value trees.

Pine Engraver Beetles

Pine engraver, Ips spp., attacks have been recorded on most species of pines in California. These beetles kill saplings, poles and sawtimber up to about 26 inches dbh and the tops of even larger trees. Attacks on live trees are usually limited to trees which are suppressed, or stressed by dwarf mistletoe, root disease, drought, fire or the attack of other insects. If fresh slash is available in the spring, pine engravers may build up in an area and cause localized mortality or top killing by mid-summer.

Attacks are made with the coming of warm weather in the spring. Attacking males bore nuptial chambers in the inner bark and release a pheromone which attracts other beetles to the attack site. If many beetles are attracted, they may attack nearby trees and cause a group kill. Within a day or two of the attack by the male, two to five females enter the nuptial chamber and after mating, each female bores an individual egg gallery which lightly scores the sapwood. The size and pattern of the combined gallery pattern is often diagnostic of the species of Ips involved. The galleries are kept open by beetles pushing boring dust out through the entrance hole. Red boring dust collecting in bark crevices or spider webs is diagnostic of a successful attack. Eggs are laid in niches along the sides of the galleries. Larvae hatch from the eggs and feed in the phloem. They eventually pupate in cells at the end of their larval mines and transform to adults.

A new generation is produced in as little as 6-8 weeks in the spring to 4-6 weeks in mid-summer (August). Thus, several overlapping generations per year may be produced. The winter may be passed in any of the life stages of larvae, pupae, or adults, depending upon which Ips species is involved.

Outbreaks in standing, healthy trees are sporadic and of short duration, and are often associated with some temporary stress or shock afflicting the host species, such as drought or logging disturbance. Tree killing frequently occurs where green pine slash, which serves as breeding habitat is left untreated during spring and summer. To be suitable as pine engraver breeding habitat, pine slash must have bark from 1/8 to 1 inch thick (usually 3 to 26 inches diameter), must have succulent cambium and must remain moderately cool during the development period.

Fresh pine slash caused by thinning, dwarf mistletoe control work, construction or winter storm breakage can be modified in a number of ways to make it unsuitable for pine engraver breeding. Utilization of the cut material to the smallest possible diameter will minimize the amount of breeding material available to engraver beetles. If green pine slash must be created during the spring and early summer, slash treatments are available to prevent the buildup of pine engraver populations. Because pine engravers can complete their development in about a month under ideal conditions, treatment should be carried out soon after cutting to be effective.

Slash treatment methods which generally work well include chipping, lopping and scattering slash in sunny areas to heat it up, crushing or mashing slash with logging equipment to make it unsuitable for pine engraver breeding, or piling and burning the slash within a month of cutting. Broadcast burning the slash might work if it could be done without damaging the residual stand. Two practices which should generally be avoided are piling fresh pine slash without further treatment, and allowing slash to touch or remain near valuable leave trees.